REMARKS

The Official Action of June 1, 2005, and the prior art cited and relied upon therein have been carefully studied. The claims in the application are now claims 1-15, 17 and 21-22, and these claims define patentable subject matter warranting their allowance. Favorable reconsideration and such allowance are respectfully urged.

Claims 16 and 18-20 have been canceled, and new claims 21 and 22 added. Claims 1-15, 17 and 21-22 remain in the application for consideration.

In response to the Examiner's objection to the drawings and claims 10 and 12, Applicant has respectively canceled claim 16 as it is the single claim directed to the "distance" feature identified by the Examiner as not being disclosed in the drawings, and has amended claims 10 and 12 to correct the misspelling identified in those claims. Applicant respectfully submits that these objections have been overcome.

The Examiner has further rejected claims 1, 5 and 17 under 35 U.S.C. §102(b) as being anticipated by Ridd '794, claims 2, 6-12, 16, 16 and 18 under 35 U.S.C. §103(a) as being unpatentable over Ridd in view of Bischoff '840, claims 3, 4 and 14 under 35 U.S.C. §103(a) as being unpatentable over Ridd

in view of Bischoff, further in view of Srnka '518, and claims 19 and 20 under 35 U.S.C. §103(a) as being unpatentable over Ridd in view of Barker '538. Applicant respectfully traverses all of these rejections as applied to the claims as amended and new claims 21 and 22.

As the Examiner will note, claim 1 has been amended to indicate that the device is a towing cable which tows along the water covered subsurface.

Ridd disclose a probe device that is put "at a fixed location within the operative range of the surface level of the sediment" (col. 1 lines 44-45 and lines 59-60). This probe device is intended to be "at least partially embedded in west sediment under the seawater and left in place" (col. 2 lines 18-19). The probe is designed to monitor the sediment level at a fixed position (col. 2 lines 44-61). The probe device of Ridd et al. is buried in the seabed and remains there for an indefinite period of time in order to monitor changes in sediment thicknesses over relatively long periods of time. Hence, this probe is not a towing cable which tows along a water covered subsurface, therefore patentably defines over Ridd.

Applicant further notes that claim 5 is dependent upon claim 1 such that the subject matter of claim 5 also

differs from the disclosure of Ridd. For clarity, claim 5 has been amended by the addition of "whereby the second voltage electrode (15) is located between the first voltage electrode (14) and the second current electrode (11),". This feature is shown e.g. in figure 1 and defines more precisely the position of the first and second voltage electrodes. Claim 17 has been amended to include the limitations of claims 18, 19 and 20 such that the subject matter of this amended claim clearly differs from the disclosure of Ridd

For clarity the features "whereby the second voltage electrode (15) is located between the first voltage electrode (14) and the second current electrode (11), " and "whereby the first current electrode (9) is positioned more remote from the voltage electrodes (14, 15, 18, 19, 20) than the second current electrode (11), " have been added to claims 7 and 15, respectively. These feature are shown e.g. in figure 1 and define more precisely the position of the voltage electrodes.

Ridd uses at least three different electrode pairs to determine the sediment thickness on top of a buried probe device.

As explained for the probe device represented in figure 3, voltage potentials are measured across five voltage electrode pairs that are placed symmetrically around the

current electrode midpoint (col. 5 lines 55-59), i.e. the centers of the voltage electrode pairs and the current electrode pair coincide.

Consequently, it is not correct to assume that voltage gradients are measured across pairs of voltage electrodes as set out on page 5 lines 10-21 of the June 1, 2005, Official Action.

Further, it should be noted that the probe device of Ridd et al. is relatively small, e.g. the example shown in figure 3 has a width of approximately 1 meter (col. 5, lines 46-47), compared to the length of a towing cable as disclosed in the present patent application and also in Bischoff.

In this respect, it is important to note that the very short distance between the voltage electrodes and the current electrodes relative to the distance between the current electrodes will result in the measurement of a non-linear electrical field gradient.

Therefore, it is clear that the method of Ridd is based upon measuring the non-linear electrical field close to the current electrodes, which may be sufficient for determining the sediment thicknesses above the probe device. However, this is a completely different approach from the one

used for towing cables as described in Bischoff and in the present patent application.

The method of Ridd makes use of a simple 2-layer model of the subsurface consisting of a sediment thickness H and an infinitely thick water layer on top of the sediment that assumes the sediment to be homogeneous above as well as below the probe device (col. 4 lines 46-50). This method may function properly as a tool to determine sediment thicknesses above the probe device but is not suitable for determining the composition and thicknesses of soil layers of the marine seabed.

Hence, from the position of the electrodes it can be derived that in the method of Ridd a non-linear electrical field is measured, while in the method of the present patent application a linear electrical field is measured. Further, the aim of the method of Ridd is to obtain the thickness of the sediment above the probe device in the implicit assumption of homogeneous sediments above and below the device, while the aim of the methods of the present patent application and Bischoff is to determine the composition and thicknesses of soil layers of the marine bottom under the towing cable with disregard of the above assumption.

Although Ridd is using a probe device with two current electrodes and a number of voltage electrodes between the current electrodes, it is clear that this probe device is not suitable for towing along water covered surfaces for resistivity soundings on the subsurface. The method and device described by Ridd is not suitable for resistivity soundings as described in the present patent application and Bischoff.

In contrast, Ridd suggest using a number of probes deployed in the seabed over a desired area in order to monitoring sediment dynamics over the whole area (col. 2 lines 40-43). In the present patent application and in Bischoff use is made of a towing cable for determine the composition different soil layers and the thicknesses of these layers.

It should be clear that the method disclosure by Ridd is based on voltage measurements that are different from measurements with a towing cable as disclosed in the present patent application and also in Bischoff.

Ridd can be considered to concern a different technical field compared to the present patent application since the device is adapted to measure a different parameter and this parameter is measured for a different purpose.

Ridd discloses a probe device of completely different dimensions, i.e. a width of approximately 1 meter (col. 5, lines 44-48), compared to the claimed towing cable. This probe device is used in a different way since it is embedded in the sediment at a fixed position (abstract; col. 3, lines 11-14; col. 5, lines 26-29). The aim of the measurement with the probe device of Ridd is different, i.e. monitoring changes in the underwater sediment level (abstract; col. 2, lines 44-61), and the result of the measurement is likewise different, i.e. the height of the sediment above the probe device. The measurement is based on the difference of conductivity between the water and the sediment (col. 5, lines 29-33) and is performed by the determining voltage potentials across symmetric electrode pairs (col. 5, lines 57-59).

Consequently, in view of the above, one with ordinary skill in the art would not consider using the electrode configuration of Ridd on a towing cable as disclosed by Bischoff. The electrode configuration of Ridd is not suitable to be used on a towing cable for determining resistivities such that the composition and thicknesses of soil layers of the marine bottom can be determined.

As noted above, claim 17 has been amended to contain all limitations of original claims 18, 19 and 20. Further,

this claim is now dependent from claim 7. As such, it refers to an electrode configuration for use in the method according to claim 7. Amended claim 17 claims a specific electrode configuration that is suitable for using on a towing cable as in the method of claim 7 wherein the distance between the voltage electrodes increases from the closest current electrode towards the more remote current electrode.

With regard to Barker, it discloses different combinations of electrode configurations with 5 electrodes. The distances between these voltage and/or current electrodes are increased gradually (col. 4 lines 54-63, figure 3 and figure 4). Figure 3 shows an electrode configuration from which 5 electrodes are selected. Barker only discloses increasing distances between the voltage electrode pairs in combination with an increased distance between the current electrode pair (col. 4 lines 54-63, figure 3 and figure 4 examples 12 and 13). As such, Barker discloses three voltage electrodes positioned on one line between two current electrodes. The distances between the selected electrodes are the same, i.e. a, 2a, 4a or 8a. Three possible electrode pair combination are shown in figure 4, examples 1, 12 and 13. These examples fail to disclose that the distance between the voltage electrodes increases from the closest current electrode towards the more remote current electrode.

Consequently, the electrode configuration of amended claim 17 is not taught by Barker in order to plot a resistivity/electrode spacing curve.

Applicant respectfully submits that in light of the above discussion, claims 1-15, 17 and 21-22 patentably define over Ridd, alone or in combination with additional cited prior art.

The prior art documents made of record and not relied upon have been noted along with the implication that such documents are deemed by the PTO to be insufficiently pertinent to warrant their applications against any of applicant's claims.

Favorable reconsideration and allowance are earnestly solicited.

Respectfully submitted,

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